



"Deisley Janet VANM"
<janet.deisley@teckcominco.com>

04/17/2008 03:18 PM

To "Daniel_Audet@nps.gov" <Daniel_Audet@nps.gov>
cc Monica Tone/R10/USEPA/US@EPA, Marc
Stifelman/R10/USEPA/US@EPA, Kevin
Rochlin/R10/USEPA/US@EPA, "Adzic Marko SPOK"
bcc

Subject Comments on draft recreational use survey design

History: This message has been forwarded.

Dan:

While we recognize that the *Statistical Sampling Plan for Lake Roosevelt Recreational Use and Fish Consumption Study* IEC emailed on April 13, 2008 is a draft, there are some significant gaps in the design that need to be addressed before proceeding with the survey effort.

TCAI's primary comments/questions are as follows:

- Details on estimating exposure levels through recreational use are lacking. Is there an accompanying analysis plan in preparation?
- More information on the justification of survey intensity is needed. What is the rationale behind the extensive level of effort in the sampling plan?
- There is no discussion about collecting specific information relevant to a Human Health Risk Assessment, agreed to during our February 29, 2008 meeting in Spokane, summarized in the follow-up memo dated March 14, 2008, and confirmed during the meeting/conference call on March 27, 2008 in Seattle. Was information about a reach-based exposure unit, demographic distinctions, and other items discussed at earlier meetings taken into consideration?
- Was a review of background information about previous consumption research in the UCR completed?

The attached memo elaborates on these four primary gaps and also gives examples of other specific concerns. After you and your team have had a chance to review the memo, perhaps the most expeditious way to discuss EPA's and TCAI's comments would be via a conference call which I would be happy to coordinate.

Regards, Janet

Janet Deisley

EHS Manager | Teck Cominco Limited
600-200 Burrard Street, Vancouver, BC V6C 3L9
ph: 604 685 3085 | cell: (b)(6) | fax: 604 640 5387



email: janet.deisley@teckcominco.com Notes on IEC Survey Design.doc

USEPA SF



1307064

UCRSF
211.1
4/17/08

MEMORANDUM

To: Janet Deisley, (Teck Cominco American Incorporated – TCAI)

From: Gretchen Greene and Doug MacNair (ENTRIX, Inc.)

Re: **Statistical Sampling Plan for Lake Roosevelt Recreational Use and Fish Consumption Study**

Date: April 17, 2008

Industrial Economics, Incorporated (IEC) has prepared a sampling plan for the collection of site-specific activity data for use in conducting the Human Health Risk Assessment (HHRA) for the Upper Columbia River Site. The plan includes a detailed listing of the sampling frequency for each location of interest (campgrounds, boat launches, and beaches) and discusses the process by which interviewers will approach recreators. It also provides a broad outline of the types of questions that will be asked and provides an example of how some statistics will be calculated. This memorandum provides our preliminary comments on the IEC sampling plan. General comments are first provided, followed by specific comments.

General Comments

In general, we have some major concerns with this sampling plan. These are:

1. There is no accompanying analysis plan, and the one example of analysis does not appear to be relevant to the HHRA process.
2. There is no justification for the level of survey effort – which ought to follow from the analysis plan.
3. There is no acknowledgement of the many survey features agreed upon by the group at meetings earlier this year (such as using a reach-based exposure unit).
4. There is no background information about previous consumption research in the UCR, or how that might be used in the analysis.

The lack of an analysis plan raises concern about going forward with a survey effort that does not provide quality data for the agreed-upon primary purpose which is the HHRA. The one example of how any survey data might be used to calculate exposure levels describes the calculation of total hours of annual swimming (across all recreationists) that occurs in the upper, and the lower portions of the rivers. Such a calculation might be useful for park management purposes, but to our knowledge is of no use in estimating exposure levels for an HHRA.

The sampling strategy provided is somewhat more thoroughly developed than a similar presentation of this information provided in the IEC memorandum of October 22, 2007. We believe this type of information should only be developed once the specific data items have been clearly identified, and an analysis plan has been developed that justifies the magnitude of the

survey effort. Yet we were not able to find justification for the magnitude of survey effort that is proposed in either this document or the earlier memo from October.

Neither does the new presentation advance the plan in accordance with the strategies agreed upon during our meetings of February 29, 2008 in Spokane and confirmed during the meeting/conference call on March 27, 2008 in Seattle. During these meetings (as outlined in a memo from TCAI and ENTRIX, Inc., dated March 14, 2008) several features of the survey sampling and analysis plan had been determined. These include:

- A “reach-based” approach to exposure
- Determination that affected populations should be segmented by four age groupings based on the risk assessment calculations.
- A demographic distinction between those who visited regularly versus occasionally.
- Different approaches to collecting exposure frequency and duration data by reach and activity for a number of specific data items, including fish and faunal consumption.

Finally, there is no background information about previous research as described in the Statement of Work for the Remedial Investigations and Feasibility Studies Upper Columbia River Site, Exhibit A,

A review of available consumption information will be conducted as part of the planning process for the Tribal and general public recreational consumption and resource use surveys. (page 29)

More specific comments and ideas are provided below.

Specific Comments

The sampling plan seems to focus a lot of effort on being able to count users rather than on collecting data for the HHRA and meeting the needs of the recreational use study, described in Exhibit A of the Settlement Agreement. As a result, it appears that the sampling intensity and level of effort may be significantly higher than it needs to be for the HHRA. However, the proposed sampling plan does not provide sufficient detail to be certain that this is true. It is our understanding that the sampling plan was supposed to include a detailed description of the estimation procedures and the types of estimates that will be supported by the data. The level of detail in the current sampling plan does not appear to meet those requirements.

Our specific comments are premised on an understanding of the goals of the recreational use survey, which is first described. Following the description, a list of specific concerns is provided.

Goals of the Recreation Use Survey

The purpose of the HHRA is to characterize the distribution of exposure-related activities of recreators to areas of interest at the site. This study is explicitly concerned with exposure to fish and game, surface water, and soil/sediment. Therefore the key metrics are as follows:

- Distributions of individual estimates of grams/day of fish caught within the site and consumed, combined with estimates of number of days/year on which fish are consumed, including information regarding kind and size of fish consumed, stratified by age category and catch location
- Distributions of individual estimates of days/year and hours/day (for days of exposure) for contact with surface water (distinguishing between swimming at a beach vs. open water swimming from a boat) stratified by age category and location
- Distributions of individual estimates of days/year at beaches by location and age category (to estimate exposure to beach sediment)

These parameters need to be characterized for each subpopulation of interest (e.g., young child, older child, and adult) and for each area of interest based on the intended segregation of the contaminant analysis data for the HHRA. We have no information regarding the intended analytical data segregation and therefore cannot make any specific comments; however, if the data will be segregated by area, then that information should be considered in designing the data needs from the activities surveys. It may be sufficient to assume similar activity patterns for different areas of interest (which simplifies the survey and the statistical analysis), but that decision should be considered in the survey design. For example, does the presence or absence of facilities affect the nature of exposures at a beach? Does beach accessibility affect exposures? Do exposures vary with beach visitation rates? It is not clear whether that has been done here since the exposure units to be evaluated in the HHRA are not defined.

The HHRA typically uses the exposure-related activity information to characterize both a "Reasonable Maximum Exposure" (RME) (usually the 95th percentile of each exposure parameter) and a "Central Tendency Exposure" (CTE) or average user. Therefore, the emphasis is typically placed on collecting detailed information from a sample of users to sufficiently characterize the distribution across users. The total size of the population of users is not relevant to the HHRA analysis. Within that framework, there are two potential methods for calculating annual exposure of the 95th percentile user:

- Compute the 95th percentile of each individual exposure parameter that we are characterizing (e.g., hours/day and days/year for swimming exposure) and apply those 95th percentile values together in the HHRA estimate of upper bound risk.
- Compute the distribution of days of exposure. Compute the distribution of exposure per day. Perform a probabilistic risk analysis by drawing from each distribution and computing the 95th percentile of the distribution of exposure.

ENTRIX

Which approach is going to be used can have an impact on the sampling plan design. However, regardless of the approach, it is the distribution of use and exposure, not the total amount of exposure or use that is important to the HHRA. Most studies typically rely upon self-reported visitation days. This is subject to recall bias; however, since the focus is not total visitation and since the bias is known to be high (and HHRA calculations are purposefully biased high by design), this issue is not a primary concern.

Exhibit A of the Settlement Agreement states that the purpose of the recreation study is to describe the activities of the "typical" user. The exposure pathways that are to be evaluated are not stated in the sampling plan; however, previous documents indicate concern for swimming/wading exposure to surface water; ingestion of beach sediment; ingestion of fish, shellfish (mussels), and game. The activity-related data required to evaluate these pathways are as follows:

- Number of days/year where (shell)fishing/hunting is the primary activity
- The amount of fish/shellfish/game consumption associated with a typical (shell)fishing/hunting activity
- Number of days/year where swimming is the primary activity
- Hours/day for swimming/wading (assuming that both will be treated as though swimming) activity on swimming days
- Number of days/year at the beach (swimming/wading or not)
- Number of showers/year at the site
- Typical duration (minutes/day) of a shower at the site

As stated previously, these data all need to be stratified by age and by area (as appropriate to the HHRA data analysis). This type of activity-related exposure data can easily be collected (and in some cases needs to be collected) as part of the HHRA. Again the focus should be getting the distribution of these activities across users. Although the self-reported number of days and trips will be biased, they can be scaled based on car count and fee data. Therefore, the National Park Service will have the data it needs for management and risk communication purposes.

Specific Concerns

1. **Sample size.** The reasoning or rationale behind the intensity of the sampling plan selected is not provided. The plan involves 640 sampling shifts in the first five months alone, yet there is no discussion of why such an extensive level of sampling is necessary. Assuming 6 people interviewing for 16 weeks (or 22?), 5 days a week, 6.5 hours a day, 2 interviews per hour, we would expect at least 6,240 interviews. Assuming 3 people per party, these interviews would represent nearly 19,000 people. If our assumption about the desired metrics is correct, then such a large sample would seem unnecessary. Although it is speculation on our part, it may be that IEC expects fewer completed

surveys per hour, because the survey staff will be also counting users that are not participating in the survey. However, we don't think diverting staff to counting is necessary, because the primary focus should be completing interviews. It seems that a staff of 2 people, who could complete 2,080 interviews, would be sufficient. A related question is whether or not it is necessary to survey at every site, multiple times? Footnote 4 on page 5 of the October 22, 2007 memo states that the sampling approach is designed to provide estimates for broad areas of the lake, not for individual access points.

2. **Unclear description of data collection and use.** The description of the data collected and estimation approach does not cover many of the complexities that will need to be addressed and may affect the necessary sample size. For example, the sampling plan states that the survey will ask boaters about the number of days that they use the beach, but (we assume) they will not be asked about the duration of that exposure. The results of the beach use survey will be used to estimate beach exposure of boaters. It is not clear how this will be accomplished and exactly how double counting will be prevented.
3. **Incorrect and incomplete estimation procedures.** There is almost no discussion of the types of estimates that will be supported by the data. This information is crucial for an accurate evaluation of the sampling plan. The one example the plan provides is for use visitation statistics, which is not the type of statistic that would be relevant for an HHRA.
4. **Lack of specificity.** There is a lack of specificity about the entire approach and analysis that should be corrected prior to developing the survey instrument. The following quotations (both from page 19) from the document are good examples:
 -"visitors will be classified as occasional or frequent (specific classification criteria to be determined), and separate average exposures will be calculated for each of these subgroups." It was agreed at the February 29th meeting that the criteria would be based on respondent answers to the question of whether or not they recreated at the lake during each of the four seasons.
 - "With on-site interviews conducted at a single location, avidity bias is addressed by simply weighting each individual's responses by the inverse of the total number of trips taken by the individual during the survey period. The weighting procedures will be somewhat more complex with the sampling strategy described above." Use of weights is a critical element in any statistical design, and needs to be explained fully in this document.
5. **Data for estimating use versus HHRA.** Some of the complexity of the study comes from an apparent intent to estimate recreational use at the Lake Roosevelt National Recreation Area. To estimate use, it is necessary to address repeat use of a resource in a single day, double-counting, recall bias, and linking data from a count study to the interviews. Estimating use and estimating exposure have different data requirements. During discussions at the February 29th meeting, it was agreed that estimating use, or any other information not needed for the HHRA but useful for the park, would be considered only as a secondary priority.

6. **Beach survey procedures.** The approach includes interviewing beach users after they complete their beach visit. People may not be willing to be interviewed at the end of their visit because they are likely to be tired, hot/cold, wet, sandy, hungry, and carrying a lot of equipment. Further, the beach survey could be lengthy for people who have a party that has engaged in multiple activities, such as swimming, sunbathing, picnicking, and fishing. These people are even less likely to be willing to be interviewed. Moreover, the beach could be a large area to cover. If the survey staff is focused on counts, it may detract from the effort to gather complete information for the surveys, which is the primary goal. Conducting interviews while people are enjoying the beach is a preferred approach.
7. **Initiation timeframe.** The survey is scheduled to begin in late May. However, the sampling and analysis plan is incomplete and does not explain how the information gathered in the survey will be used to calculate exposure estimates. The survey sampling, questionnaires, and analysis are likely to be very complex and it is important to lay out the analysis procedures before the survey is initiated. This will ensure that the information gathered will be sufficient to meet the data needs of the HHRA. Since the survey is designed to gather data for a full year, it is possible to begin at any point during the year.
8. **Trying to interview everybody whenever possible.** This level of effort seems unnecessarily burdensome. Perhaps limiting the interviews to some fraction of the people (e.g., every fifth user) would be more practicable.